# Chapter 3. Affected Environment and Environmental Consequences - Overview of Impact Analysis Approach



C-060421

# Chapter 3. Affected Environment and Environmental Consequences - Overview of Impact Analysis Approach

The following chapters, 3A-3O, describe the affected environments and analyze the environmental impacts of the DW project alternatives in the following 15 resource topics:

- water supply and water project operations,
- hydrodynamics,
- water quality,
- flood control,
- utilities and highways,
- fishery resources,
- vegetation and wetlands,
- wildlife,
- land use and agriculture,
- recreation and visual resources,
- economic conditions and effects,
- traffic,
- cultural resources,
- mosquitos and public health, and
- air quality.

Supplementary information for the resource chapters is included in technical appendices in a separate volume accompanying this EIR/EIS. Technical appendices are listed in the table of contents.

The selection of topics covered in the impact analysis is based on the issues raised in scoping comment letters, comment letters on the 1990 draft EIR/EIS, and water right protests submitted to SWRCB, and issues raised during revision of the 1990 draft EIR/EIS.

## AFFECTED ENVIRONMENT

The "Affected Environment" section of each resource chapter describes the environmental setting and the sources of environmental setting information for the chapter. The environmental settings provide a point of reference (or baseline) for comparing the environmental impacts of the various project alternatives.

### General

The environmental setting information for the DW project depends on the conditions particular to each resource topic. Conditions on the DW project islands may have changed since the project was first proposed and since the 1990 draft EIR/EIS was prepared. Certain changes may have occurred because of environmental factors or land use management decisions made in response to agricultural needs (limited to activities that do not require any state or federal agency discretionary approval). For example, portions of the island that were fallow in 1989 may now be in agricultural production or vice versa. The "Affected Environment" section of each resource chapter is based on one of the following:

- **Information presented in the 1990 draft EIR/EIS (conditions existing between 1987 and 1990).** For certain resource topics, because of land management activities occurring since

1987 (e.g., reduction in acreage of crop production), the "1987 point of reference" provides the most reliable description of the affected environment.

- **Current information (conditions existing between 1991 and 1994).** In resource areas for which information was not obtained for preparation of the 1990 draft EIR/EIS or factors outside the control of the project applicant altered the setting, the "1994 point of reference" provides the appropriate description of the affected environment.

### Water Operations

Since the DW project was first proposed in 1987, there has been uncertainty regarding the standards applying to the management of water in the Bay/Delta estuary and, therefore, the standards defining existing conditions for water operations to be used as a baseline for comparing the environmental effects of the proposed DW project alternatives. For those chapters in the EIR/EIS analyzing water operations, the analysis is based on the most likely regulatory constraints that will exist when the DW project is implemented.

The most likely regulatory scenario consists of implementation of SWRCB's 1995 WQCP, which incorporates the protection measures from the NMFS 1993 biological opinion for CVP and SWP operational effects on winter-run chinook salmon and 1995 amendments, and the USFWS 1995 biological opinion for CVP and SWP operational effects on delta smelt. This scenario includes existing Corps requirements for SWP exports at Banks Pumping Plant. The assumptions regarding this regulatory scenario are presented in Chapter 3A, "Water Supply and Water Project Operations", and Appendix A3, "DeltaSOS Simulations of the Delta Wetlands Project Alternatives".

## IMPACT ASSESSMENT METHODOLOGY

### General

The "Impact Assessment Methodology" section of each resource chapter:

- describes the methodology for the impact analysis for the specific resource topic;
- presents the reasons for the selection of the impact assessment variables for the specific resource topic; and
- describes the basis for determining whether the impacts of the project alternatives for the specific resource topic are less than significant, significant, or beneficial.

### Resources Affected by Water Operations

For those chapters involving assessment of how the Delta would be affected by water operations of the DW project, impact analysis based purely on survey results is not possible. Various models were used to analyze the effects of water operations of the DW project described in Chapters 3A, 3B, 3C, and 3F. The models developed to analyze Delta operations and effects of DW project water operations are based on the best available tools for water resource impact assessment. Figure 3-1 presents an overview of conditions analyzed for these chapters, model inputs, models, and data sets generated for these analyses. The analyses are described in detail in these chapters and related appendices.

The 70-year hydrologic record (water years 1922-1991) for the Delta is the best description of likely future Delta hydrologic conditions. Future Delta operations are therefore modeled based on this record: the simulations of DW project operations are based on estimates of water that would be available for diversion and discharge under hydrologic conditions replicating those of the 70-year record. All data and modeling results are presented in water years rather than calendar years (i.e., beginning in October of the previous calendar year and ending in September of the specified year).

The hydrologic record alone, however, will not provide an accurate estimate of future operating conditions. The modeling must also be based on anticipated regulatory standards, facilities, and demand for exports, rather than those conditions that existed during the years of the hydrologic record. As described above, the simulations of the DW project alternatives were based on an assumed regulatory scenario consisting of implementation of the 1995 WQCP; the simulations also assumed current Delta operations, facilities, and demand for exports. Model simulations of Delta operations and effects of DW project water operations are considered adequate for impact

analysis if they follow general patterns of data (e.g., peaks and trends) and indicate expected responses to changes in the model inputs (i.e., sensitivity) comparable to changes observed in available measurements. The simulation results are presented graphically, rather than in statistical summaries, to better demonstrate the correspondence to the general patterns of data. Although simulation results are shown corresponding to years of the hydrologic record (e.g., water years 1922-1991), it must be remembered that these results represent operations that would have occurred in those corresponding years only if current standards, facilities, and upstream and export demands for water had been in place.

The DW project as proposed will operate under a range of Delta restrictions. The EIR/EIS analyzes the environmental effects of DW operations within this range. Generally, the DW project would divert water during wet periods when high flow conditions exist in the Delta and would discharge water during drier periods when unused export capacity exists. Recent proposals to change Delta operations are not perceived to have significant effects on the relative environmental impacts of the project or impact conclusions drawn from the analyses, and may only slightly affect the average annual yield of the DW project. Modifications to Delta operations may have no significant effect on the conclusions of this draft EIR/EIS and the yield of the project. Major relaxation of current environmental standards affecting Delta operations could affect the environmental impact assessment beyond the probable range of effects discussed in this draft EIR/EIS. Greater restrictions on Delta operations either would not affect the environmental impact assessment or may reduce the impacts assessed in this EIR/EIS.

Proposed mitigation measures and monitoring requirements may be modified during the endangered species consultation process and SWRCB water right hearing as part of the terms and conditions of water right permits. Therefore, final DW project operations may not exactly match the modeling assumptions.

Simulated effects of DW project operations on the Delta cannot be directly compared with the historical record of Delta operations for purposes of impact assessment because historical Delta operations did not include current operating criteria; facilities; and conditions, such as upstream and export demands for water. To provide a point of reference for assessing the impacts of simulated operations of the DW project alternatives, it was therefore necessary to also simulate a baseline condition consisting of the same operating conditions but without operations of the DW project. This point of reference is the simulated No-Project Alternative (see below). As with the DW project alternatives, simulation results for the No-Project Alternative are shown corresponding to the 70-year hydrologic record (e.g., water years 1922-1991); these simulation results, however, do not correspond to historical Delta operations and should not be confused with actual Delta operating conditions for these years. They represent Delta operations, based on monthly averages, that would likely have occurred under the hydrologic conditions of those water years with a regulatory scenario consisting of the 1995 WQCP and with current facilities and upstream and export demands for water. It should be noted that actual daily Delta operations may vary from the monthly averages.

### Reservoir Island Storage Capacity

Impacts of the water storage operations of the DW project alternatives are assessed based on the assumption that reservoir capacity at the time of project implementation will be 238 TAF for Alternatives 1 and 2 and 406 TAF for Alternative 3. The total storage capacity of the reservoir islands under the DW project alternatives may increase over the life of the project because of subsidence. No method currently exists to predict the rate of subsidence on a Delta island used for water storage operations or, therefore, to predict the increase in the storage capacity. According to DW's estimate for subsidence under water storage operations, the reservoir islands could subside at a rate of approximately 0.5 inch per year. At this rate of subsidence, the storage capacity of the reservoir islands could increase by as much as 9% over the life of the project (50 years).

An increase in water storage capacity over the life of the project would not alter the impact analysis for this EIR/EIS. The impact analysis for the DW project alternatives is based on the assumption that water operations may, in any year, include several periods of diversion to storage, followed by subsequent discharges for export or Delta outflow augmentation. The total reservoir storage capacity in any period of water storage is not the primary factor controlling the total volume of water diverted and discharged. The primary factors controlling the total volumes of water diverted for storage and discharged for export or outflow are the capacities of the siphons and pumps and durations of periods when the DW project would be allowed to divert and discharge water. These factors, rather than physical storage capacity, are the primary variables for assessing the impacts of project operations.

If the reservoir island storage capacities increase because of subsidence above the levels assumed at

project implementation, the monthly DW diversion and discharge volumes, when averaged over a year, would be greater than simulated amounts. Larger annual volumes could be diverted or discharged when sufficient water was available to fill the reservoir islands above the initial storage capacity, or when export capacity was available to completely empty the reservoir islands filled beyond the initial storage capacity. The periods for permitted diversions and discharges and the maximum diversion and discharge rates would not change, however. Therefore, the conclusions of the impact assessment of water operations of the DW project alternatives also would likely not change. Although specific impacts may increase incrementally, the change would not alter the significance conclusions in this EIR/EIS.

## IMPACTS AND MITIGATION MEASURES OF THE DW PROJECT ALTERNATIVES

### Comparison of Alternatives

The impact analysis for each resource topic in the EIR/EIS identifies and compares the probable impacts of each alternative specific to the resource topic. These comparative analyses highlight differences or similarities in predicted impacts between the alternatives. Eeach resource chapter analyzes the following project alternatives, which were described in Chapter 2:

- Alternative 1, consisting of two reservoir islands and two habitat islands, implementation of an HMP, and DW discharges for export subject to strict interpretation of the 1995 WQCP export limits;
- Alternative 2, consisting of two reservoir islands and two habitat islands, implementation of an HMP, and DW discharges for export not subject to strict interpretation of the 1995 WQCP export limits;
- Alternative 3, consisting of four reservoir islands, limited compensation habitat provided in the NBHA on Bouldin Island, and discharges for export not subject to strict interpretation of the 1995 WQCP export limits; and
- the No-Project Alternative, consisting of intensified agricultural production on all four DW project islands (see below).

Where the DW project alternatives are predicted to cause significant impacts, mitigation measures are identified. In accordance with CEQA and NEPA guidelines, measures are proposed that would avoid, minimize, rectify, reduce, or compensate for the predicted impacts, thereby reducing them to less-than-significant levels. The feasibility and effectiveness of the mitigation measures are described to the extent possible. Mitigation measures may include modifying the project design or operations to reduce predicted impacts to less-than-significant levels wherever feasible.

### No-Project Alternative

The No-Project Alternative (intensified agriculture) is discussed as a separate DW project alternative. It represents DW project island operations that do not require state or federal agency discretionary approvals and would be implemented if the lead agencies denied approval of all other alternatives. The project applicant would not be required to implement mitigation measures if the No-Project Alternative were "selected" by the lead agencies (i.e., if the lead agencies denied approval of all other alternatives). However, mitigation measures are presented for effects of the No-Project Alternative to provide information to the reviewing agencies regarding measures that would reduce effects of the No-Project Alternative. This information will allow the reviewing agencies to make a more realistic comparison of the DW project alternatives, including implementation of recommended mitigation measures, with the No-Project Alternative.

### Impact Assessment

The impact analysis used in the resource chapters was designed to comply with CEQA and NEPA guidelines. For each resource topic, three levels of impacts were considered:

- direct impacts on the DW project islands and on adjacent Delta channels;
- indirect impacts on the project vicinity, including the Delta, Suisun Marsh, and San Francisco Bay, and in some cases upstream areas, induced by direct project-related changes in the environment; and
- cumulative impacts.

The study area for analysis of direct project impacts consists of the four project islands, surrounding channels, and adjacent islands. The study area for analysis of indirect impacts is the vicinity of the statutory Delta, as defined by Section 12220 of the California Water Code; the hydrologically related Suisun Marsh and San Francisco Bay; and, in some cases, upstream areas. The study area for analysis of cumulative impacts consists of the combination of the direct and indirect impact areas.

Where uncertainty exists in predicting the extent of project construction and operations, the impact analysis is based on "worst-case" conditions. For example, the impact assessments for water supply, hydrodynamics, water quality, and fishery resources are based on the assumption that DW project operations include the maximum diversion and discharge rates for the entire storage cycle, although these rates will not be maintained during the actual operation of the project. However, the impact assessment of project operations was based on modeling of monthly averages of Delta operations; estimated impacts could be greater if based on daily simulations. Also, because DW is not certain of the size of the various recreation facilities, the impact analysis is based on the assumption that the largest possible facility will be built at all locations, even though it may not be realistic to have a facility of this size at every location.

### Direct Impacts

Direct impacts may be of two types: construction impacts and operational impacts. Construction impacts are those caused directly by construction activities, such as siting of project facilities. Operational impacts are those that result directly from project operations, such as flooding of project islands and discharge of stored water to adjacent channels.

### Indirect Impacts

Indirect impacts are those that can be reasonably expected to occur in the project vicinity. Project diversions and discharges, for example, may indirectly affect water operations and flows in other areas of the Delta and in areas upstream of the Delta.

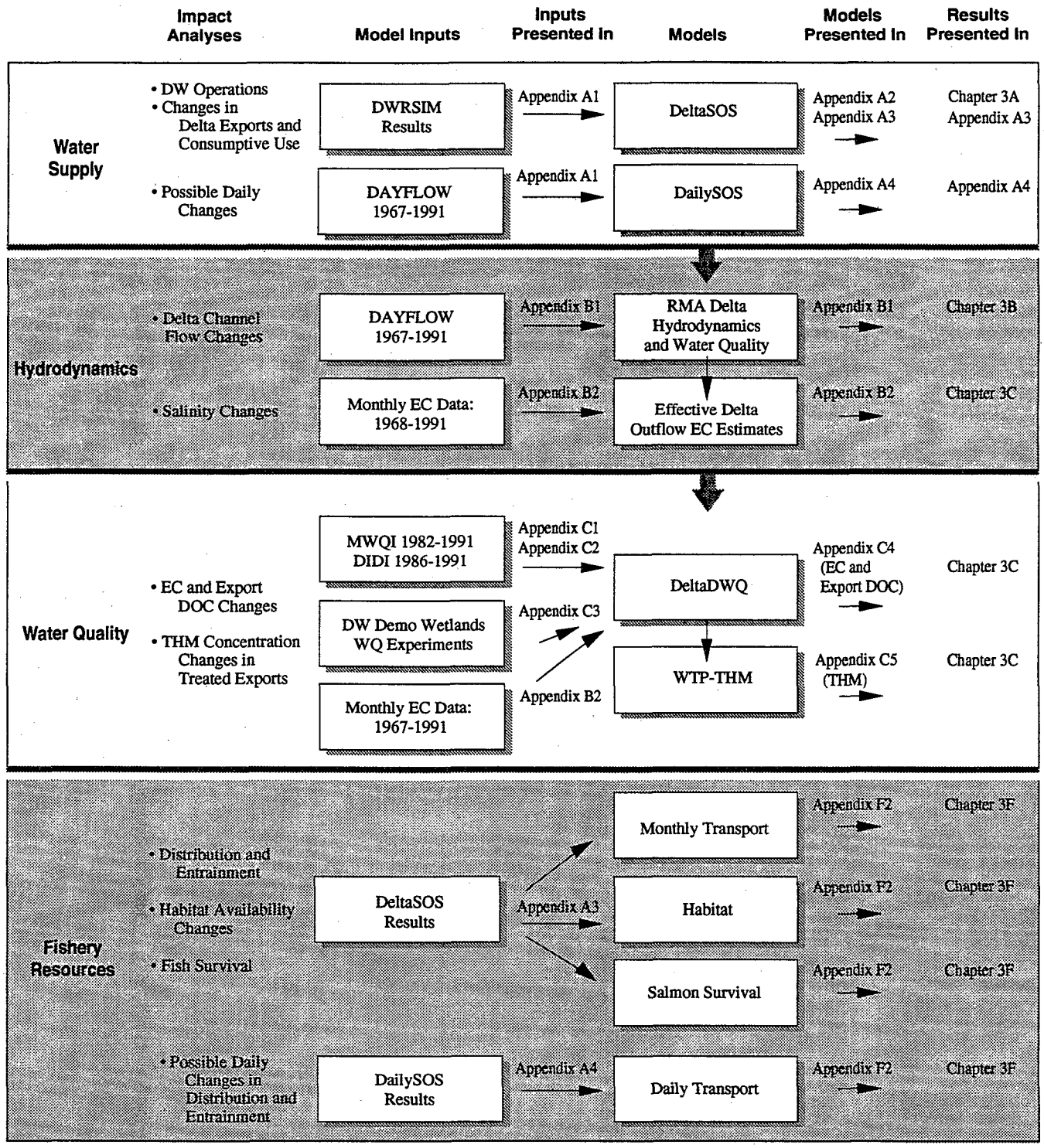
### Cumulative Impacts

**General**. Cumulative impacts, discussed in the last section of each resource chapter, are the direct and indirect impacts of the DW project alternatives considered in combination with the impacts of past projects, other current projects, and reasonably foreseeable future projects. Criteria for selecting related projects for the cumulative impact analysis are the following:

- the project must be sufficiently related to the proposed project either by location in the general Delta study area or by production of similar types of impacts on similar resources (e.g., land use conversion of agricultural lands),
- the project must be reasonably foreseeable,
- the specifics of project design or operation must be known or predictable, and
- the project must produce additional impacts beyond those already considered in the EIR/ EIS under implementation of the DW project alternatives.

**Resources Affected by Water Operations**. DWR recently installed four additional pumping units at SWP's Banks Pumping Plant. These units increase total pumping capacity from 6,400 cfs to 10,300 cfs. These pumps provide DWR with standby capacity and allow DWR to pump the quantity of water specified under Corps restrictions over a shorter period. The current pumping level is limited to a daily average of 6,680 cfs by the requirement for a Corps permit for exceedance of this rate.

For those resources affected by water operations, the cumulative impact analysis is based on the assumption that the 1995 WQCP will be in effect and that the maximum SWP pumping rate will be increased to equal full physical export pumping capacity (increased from 6,680 cfs to 10,300 cfs at Banks Pumping Plant). Such an increase may require additional facilities in the Delta, such as Interim South Delta Program facilities, but these facilities are not specified in the analysis.




EC = electrical conductivity
DOC = dissolved organic carbon
THM = trihalomethane

**Figure 3-1.**
Summary of DW Impact Assessment for Water Supply, Hydrodynamics, Water Quality, and Fishery Resources

DELTA WETLANDS
PROJECT EIR/EIS
Prepared by: Jones & Stokes Associates

C—060428